



ECE405
Requirements Capture
Bobcat RFID Inventory System

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I. Introduction

Bobcat has requested a process to monitor and control their inventory of test equipment. At their factory in Gwinner, they have an outdoor equipment yard where test equipment is stored for engineering uses and employees to use personally. Bobcat has requested an inventory system to track when equipment leaves or enters the yard. Possibilities to achieve this are RFID and active transmitters.

II. Previous Work

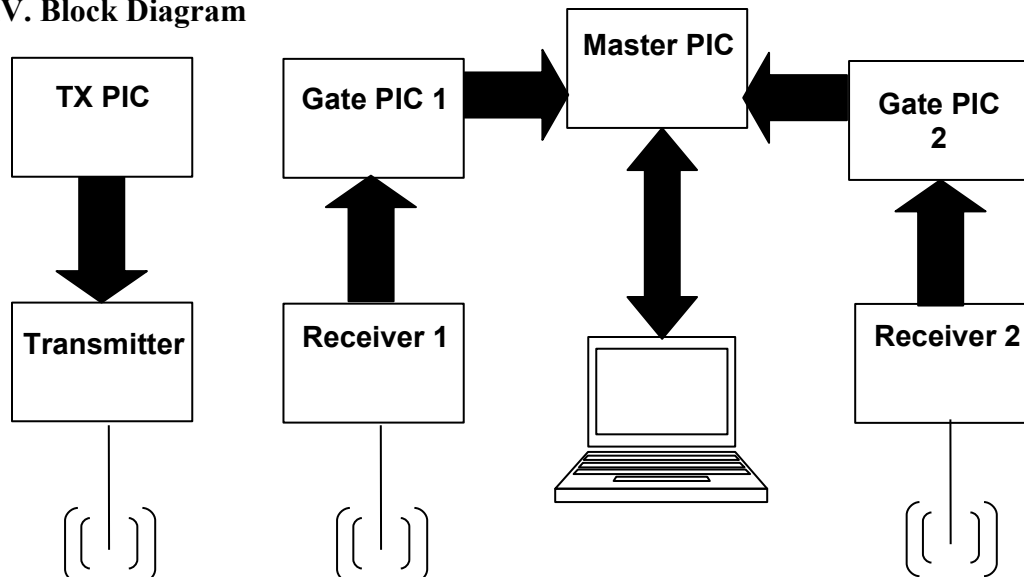
RFID tags have already been used to track and monitor inventories for many companies, such as Wal-Mart. Currently, there are two different types of tags on the market. A passive tag is one that does not have its own power but is able to transmit in the presence of a stimulating field. An active tag does have its own power and contains some memory available for use. Active tags have much more range than passive tags.

Due to cost restrictions and part availability the focus of this project will be on the use of active transmitters. Active transmitters and receivers have been used in previous design groups. They are the predecessors to RFID and are proven to work in the field. There is an abundance of transmitters that would meet the requirements given by Bobcat.

III. Requirements

Bobcat would like to be able to monitor the traffic at two exits in their equipment yard (see appendix for gate layout). They would like to be accurate within ten minutes of entering or exiting the yard. Each item of inventory needs to be detected within ten feet of the receiver. The tags need to be able to withstand the harsh North Dakota winters. An active transmitter will need to be chosen such that the batteries will last six months to a year while withstanding the cold. The receivers will be powered by a standard 110V outlet. The weight of the module should be less than 5lbs and smaller than 5" x 5" x 3". The system needs to be interfaced with Bobcat's computer network and be accessed as a text file. The user interface will allow employees to see when an item of inventory has left the yard and returned and the time of each event.

IV. Block Diagram



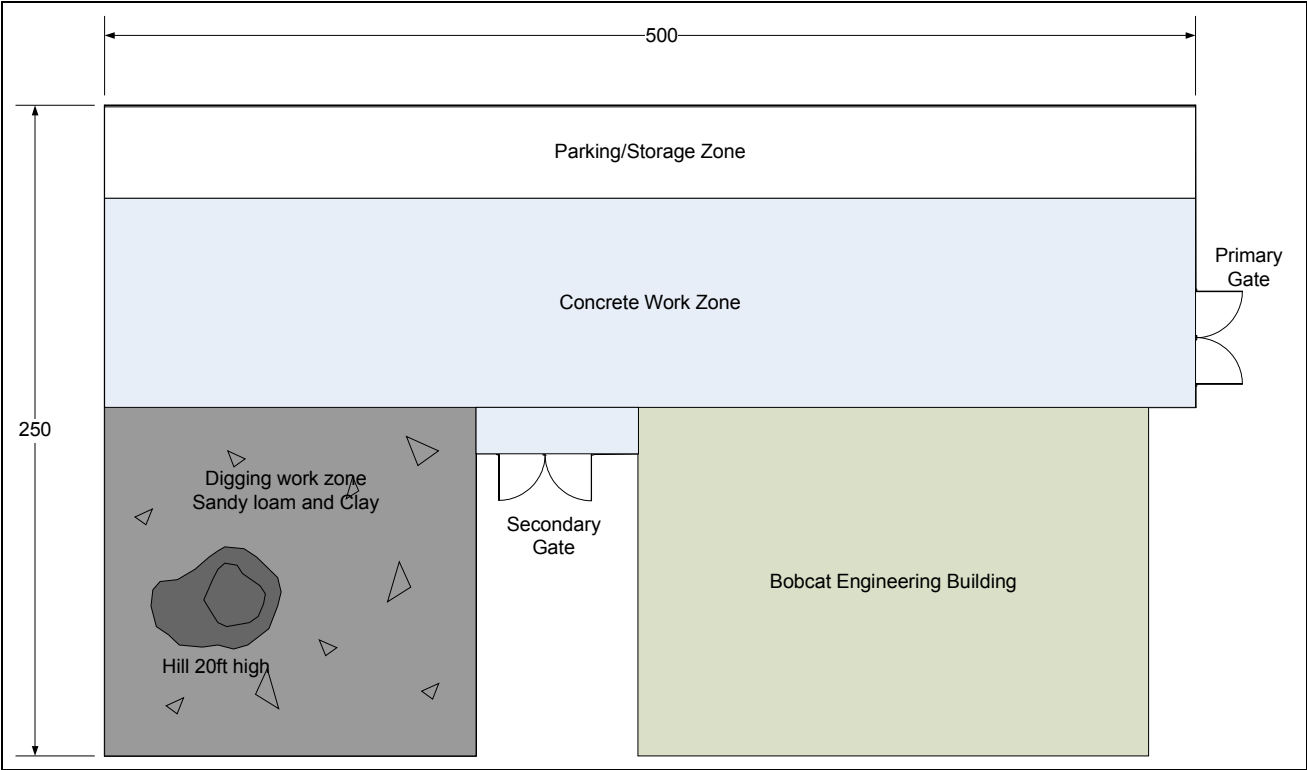
- Tx PIC: Stores ID number of equipment.
- Transmitter: Sends ID number to receiver
- Receiver 1: Receives ID number of equipment
- Gate PIC 1: Sends ID number to Master PIC
- Receiver 2: Receives ID number of equipment
- Gate PIC 2: Sends ID number to Master PIC
- Master PIC: Sends ID number of equipment along with date and time of entering/exiting the yard.

The equipment is leaving the yard if Receiver 1 detects machine first and is entering the yard if Receiver 2 detects it first.

V. Testing

To complete this project we will have to perform testing to check the battery life, the range of our gate transmitter/receiver, environmental functionality of the transmitter and receiver, location of transmitter mounting for optimal performance, and other testing to be determined by Bobcat at a later date.

VI. Appendix



Bobcat Engineering Department